

the cavity **125** and the deformation of the particular region **113** (such as the materials mentioned above in the description for the sheet **102**). The material of the top layer **501a** is also preferably of the type that allows for conductor sets **511a** and **513a** that allow for substantially accurate sensing capabilities in the user interface system **100** to be used. However, any other suitable material may be used for the top layer **501a**.

[0049] The bottom layer **503a** is preferably composed of a material that allows for conductor sets **511a** and **513a** that allow for substantially accurate sensing capabilities in the user interface system **100** to be used. Additionally, the bottom layer **503a** may be composed of a material and of a material thickness that allows for the bottom layer **503a** to include a channel **138**, as described above. The channel **138** may be fluidly coupled to the displacement device **130** to allow for the passage of fluid **112** in the second variation of the displacement device **130**. As mentioned above, the bottom layer **503a** is typically made of a glass material. To accommodate for the channel **138**, the bottom layer **503a** may be composed of a plurality of layers of a silicone material, an elastomeric material, or any of the materials mentioned in the description for the sheet **102** that is unipliable relative to the top layer **501a** to allow for inward deformation of the top layer **501a** to cause the first set of electrical conductors **511a** to come into contact with the second set of electrical conductors **513a**. However, any other suitable material may be used for the bottom layer **503a**.

[0050] The substantially accurate sensing capabilities due to the arrangement of first and second electrical conductors **511a** and **513a** of the resistive touch sensitive layer **500a** may allow the user interface system to detect more accurately the details of a user input, for example, the direction, the location of the user input relative to the geometry of the particular region **113**, the proportion of the surface area of the particular region **113** upon which the user is providing an inward deformation force, the occurrence of multiple user inputs (commonly known as “multi-touch”), the rate the inward deformation of the particular region **113** (for example, when the user causes contact between the first and second sets of electrical conductors **511a** and **513a**, because of the shape of the finger of the user, certain conductors will come into contact before others, and the time lapse in between contact events can be used to determine the rate of the inward deformation of the particular region **113**), or any other suitable detail of the user input.

[0051] As described above, the sensor **140** is preferably a resistive sensor of an embodiment described above. Alternatively, the sensor **140** may be any other suitable type of sensor that senses a user input based on the deformation of a top layer **501** or **501a** that results from a user input provided on the surface **115**. For example, the first and second set of electrical conductors **511**, **511a**, **513**, and/or **513a** may function as capacitive sensors that emit and detect an electromagnetic field and that detect that capacitance and/or change in capacitance between the first and second set of conductors to detect a user input. In other words, as the user deforms the top layer **501** or **501a**, the capacitance between the portions of the first and second set of conductors substantially proximal to the location of the user input may change. The change in capacitance may be the result of the change in the distance between the first and second set of conductors substantially proximal to the location of the user input, but may alternatively be the result of the change in the volume of fluid **112** between the first and second set of conductors substantially proximal to

the location of the user input. In this variation, the fluid **112** may function as a dielectric between the first and second sets of conductors that provides a variable capacitance between the first and second sets of conductors as the volume of fluid **112** between the conductors changes. This may be particularly applicable in variations of the fluid **112** that are electrically conducting or insulating that may affect the electromagnetic coupling between the first and second set of conductors, for example, fluids with conductive/insulative properties, fluids that include suspensions or dispersions of particles with relevant electrical and optical properties, or any other suitable type of fluid. Alternatively, the material of the sheet **102** may function as a dielectric between the first and second sets of conductors that changes as the force of the user input deforms the sheet **102**. However, any other suitable material within the user interface system **100** may function as a variable dielectric as the user provides a user input that deforms the top layer. In a second example, the first and second set of electrical conductors **511**, **511a**, **513**, and/or **513a** may function as an inductive sensor where one of the first and second set of electrical conductors emit an electromagnetic field and the other of the first and second set of electrical conductors functions as a conductor that modifies the electromagnetic field in a detectable manner (for example, as the top layer moves closer or farther away from the bottom layer) and a user input is detected. However, any other suitable type of detection of the user input using a top layer **501** that deforms relative to the bottom layer **503** with the user input may be used.

[0052] As a person skilled in the art will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred embodiments of the invention without departing from the scope of this invention defined in the following claims.

We claim:

1. A user interface system for receiving a user input comprising:
 - a tactile layer including a sheet that defines a surface and at least partially defines a fluid vessel arranged underneath the surface, a volume of fluid within the fluid vessel, and a displacement device that influences the volume of the fluid within the fluid vessel to expand and retract at least a portion of the fluid vessel, thereby deforming a particular region of the surface; and
 - a touch sensitive layer arranged substantially underneath the tactile layer that receives an input provided by a user through the tactile layer that deforms the surface of the tactile layer, the touch sensitive layer including a first layer that deforms with the surface of the tactile layer and includes a first conductor and a second layer arranged substantially underneath the first layer that includes a second conductor electrically coupled to the first conductor with a detectable electrical property that changes based on the distance between the first and the second conductors.
2. The user interface system of claim 1, wherein the electrical property is the electrical resistance between the first and second conductors.
3. The user interface system of claim 1, further comprising a processor that detects the electrical property between the first and second conductors and detects a user input as the distance between the first and second layer changes and the electrical property between the first and second conductor changes.